Appendix A-C

Quality Management Plan for Military Engineering and Design

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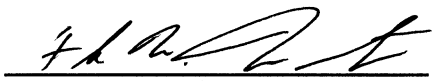

Changes to this document require the concurrence of the Management Representative and approval by the Chief, ED-M, and shall only be made following the procedures described herein.

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1.0 PURPOSE

This Quality Management Plan (QMP) for Military Engineering and Design defines the responsibilities and procedures for managing the quality of services and products delivered to our customers by the Sacramento District (SPK) Engineering Division (ED) for Military Construction (MILCON) and other Federal customers through Architect-Engineer (A-E) firms and In-House (I-H) design staff. This is Appendix C of the ED Appendix A of the SPK QMP, which should be referred to for further guidance. The activities cited in this QMP are in accord with requirements specified in 3.0 REFERENCES not already covered in ED Appendix A of the SPK QMP. SPK also provides regular MILCON design services for projects within the geographical area of Los Angeles District (SPL), and other Districts as well.

2.0 SCOPE

This QMP applies to all projects and will be followed for all deliverables, whether prepared In-House or by an Architect-Engineer firm/consultant. This QMP applies directly to all Military Design Branch personnel, and, as appropriate, to Geotechnical Branch, Cost Engineering, and Environmental Engineering Branch. This QMP also applies indirectly to all functional divisions that support MILCON projects.

3.0 REFERENCES

a. Sacramento District, Engineering and Design Quality Management Plan, Appendix A

b. ER 1110-34-1, Corps-wide Centers of Expertise

c. EP 1110-345-2, Standard Designs

d. CEMP-ET Memorandum, Subject: Military Construction Design Review Policy for Airfield, Railroad and Roadway Projects.

e. ED-M Office Memorandums

f. Engineering Quality Procedure 5-01, Procedure for the Preparation and Administration of Procedures.

g. CESPD Regulation 1180-1-9, Design-Build Contracting

4.0 DEFINITIONS

Project Manager (PM)/Project Engineer (PE) - Los Angeles and Sacramento Districts both have Project Managers for military construction projects in their respective geographic areas of construction responsibility. If a project is being designed for a Los Angeles District installation, Military Design Branch will have a Project Engineer assigned to coordinate the design effort for either in-house design products or those delivered by an A-E. In the case of Sacramento District installations, Project Managers in SPK's Programs and Project Management Division (PPMD) organization will usually handle PM duties. In these cases, the PE duties will be coordinated by the PM. Therefore, as applicable in this Plan for Sacramento District projects, any reference to a PE shall be interpreted as meaning PM. When tasked by PPMD, the PE in Military Design Branch for selected projects can perform PM duties.

Quality Assurance (QA) - Activities taken to ensure the overall effectiveness of the quality control process. Its primary emphasis deals with the prevention of nonconforming products through the evaluation and assurance of adequate quality controls being utilized.

Quality Control (QC) - Activities taken to ensure quality verification for each discipline. It encompasses such activities as detailed calculation and analysis checks, regulation compliance verification, cross discipline design

effort compatibility checks, etc. These activities shall be accomplished under SPK QMP, Appendix A - Engineering and Design Quality Management Plan.

Quality Product - The intent of SPK is to deliver quality engineering and design services and products to our customers on schedule and within budget. A quality product conforms to customer expectations in functional, technical, aesthetic, and environmental requirements. A quality product is generally consistent with applicable technical criteria and an acceptable level of quality does not imply perfection. No compromise of functional, health or safety requirements will be permitted. As such, the quality achieved for each design service and product shall be in conformance with customer requirements for that project.

Technical Compliance - Compliance with contract requirements concerning technical issues, verifying the latest criteria is used. Examples of specific issues include criteria, design assumptions, guidance codes, specifications, loads and life safety.

5.0 POLICY

Branch/Section Chiefs and all personnel involved in the design, checking and/or review process for development of ED products are responsible for adhering to the requirements of this QMP. Specific attention is required by Designers and BCOE reviewers to recognize applicable lessons learned and to see that these are entered into the system. Specific areas of responsibility and authority are described in the Authority/Responsibilities Matrix located on the SPK LAN, ED-M File Server.

The Military Design Branch shall be responsible for the engineering management of A-E and I-H prepared products by the establishment of criteria, functional requirements, an execution schedule and related budgets. The work and services in the Military Design Branch shall be according to Military Design Branch Memorandums concerning A-E Contracts, Design Execution, and coordination with the Project Manager (PM). Geotechnical Branch, Cost Engineering Branch, Environmental Engineering Branch, and Contracting Division (CT) personnel participate in and support this effort. The Military Design Branch has responsibility for the overall designer selection process, contract oversight, and performance evaluation when A-E firms are used for projects other than those managed by a Sacramento District PM. Military Design Branch shall also be responsible for the production of I-H designs. Before taking on an I-H design effort, Military Design Branch shall ensure that sufficient resources with appropriate technical capabilities are available to complete the project in the required schedule. Open-end A-E contract resources, and Mandatory Centers of Expertise (MCX) or Design Centers of Expertise (DX), will be utilized when necessary, to complement the design team.

The PM within Programs and Project Management Division is responsible for the functional areas within PPMD and over all execution of programmatic issues.

6.0 QUALITY MANAGEMENT

6.1 Project Initiation and Coordination. No work shall be initiated prior to receipt of a Design Instruction/Directive and funds for either A-E or I-H design effort.

6.1.1 Customer Requirements. The Project Engineer (PE) in Military Design Branch shall be responsible for the overall execution of a design project to meet customer requirements. As such, the PE shall be the single POC for: the customer on technical issues; the PM on programmatic issues; Program Management Office (PMO) for financial support; and the design team.

6.1.2 Technical Requirements. This function addresses a technical suitability/appropriateness overview of major system selection or design direction decisions for each discipline and the collective team involved in a design effort. Technical QA activities shall normally be accomplished near the end of each major design phase, allowing sufficient time for any required adjustments prior to submitting design documents to the PM/PE for formal review.

1) Standard Designs. The Department of the Army Facilities Standardization Program is developing standard

designs as definitive design packages. This allows each Army standard design package to be adapted to a specific installation's architectural theme and requirements. These standard designs are mandatory in the Army for planning, programming, design, and construction of the facility types for which they were developed. Standard designs are listed in Engineer Pamphlet 1110-345-2. To the maximum practicable extent, standard designs shall be used in the production of MILCON project design packages. Army installations may initiate waivers to those standards through their MACOM to the Office of the Assistant Chief of Staff for Installation Management for approval.

2) Predesign Conference. The PM/PE shall chair a Predesign (a.k.a. Scope Clarification) Conference with the customer and the design team. The purpose of this conference shall be to define clearly the customer's expectations, requirements, and scope for the project. A sufficient number of design team personnel shall attend this conference to ensure all significant technical and environmental areas associated with the project are adequately discussed and customer requirements understood. The PM/PE shall ensure the necessary customer and construction representatives (SPL/SPK) attend this conference to discuss adequately and agree on project requirements. This shall include the types of design, deliverables, review process/responsibilities, and project milestones and constraints. The conference shall include a construction site visit to allow for physical verification of the site conditions that could affect the design whenever possible. Specific information shall include, but is not limited to, field lessons learned, construction phasing, construction constraints, special testing, check out requirements, and site constraints. The PM/PE shall document the discussions and agreements reached during the conference and distribute a copy of the minutes to all appropriate parties. Appendix A-C-A is a Predesign Conference Team Meeting Checklist that may be used by the PM/PE for this purpose. The project Scope of Work (SOW) for A-E contracts and Scope of Services (SOS) In-House, Project Engineering Budget and Schedule will then be developed before initiation of design services.

3) On-Board Review. On-Board (over the shoulder, conducted in the design team office) type reviews shall be incorporated in the design process and schedule when requested by the project customer or when necessitated by unique project requirements. Reviewers shall conduct on-board reviews in the office of the design team. No preliminary information shall be provided prior to the on-board. Reviewers may stay as long as necessary to conduct the review, and leave with copies of all comments and reviewed documents.

6.1.3 Scope of Services (SOS). Prior to writing the SOS, the PM, PE, and CT representative shall agree on an acquisition plan with client as appropriate, which might have already been addressed in the District's Advanced Acquisition Planning process. The acquisition plan shall be reflected in the SOS, Total Project Budget and Schedule.

As a result of the Predesign Conference, the PM/PE shall develop a detailed SOS for the project that defines the deliverables and services to be provided by the design team to meet the customer's expectations and requirements. Project engineering budget and schedule data shall be based on the requirements specified in the SOS. The final SOS shall reflect the services that can be obtained within the Headquarters, U.S. Army Corps of Engineers (HQUSACE) or U.S. Air Force Major Command (MAJCOM) design target and the approved budget.

6.1.4 Schedule. All project schedules shall be established and maintained in Microsoft Project format based on the design requirements specified in the SOS. Appendix A-C-B is a Network Analysis System (NAS) for developing project activities, schedules, and budgets in PROMIS Work Breakdown Structure (WBS) format, and provides a systematic outline for various requirements during the design phase. Schedules shall be updated when changes occur, but as a minimum once a month (in accordance with monthly Line Item Review requirements) to ensure that critical milestones and forecast dates are met.

6.1.5 Budget. The PM/PE shall be responsible for managing the project engineering budget within the client's target budget. The PM/PE shall coordinate and negotiate effort and costs with all District engineering elements, and as applicable, A-E services associated with the production of the design package. This information shall be incorporated by the PM/PE into a Total Project Budget that reflects the total cost for all District engineering efforts associated with the development, advertisement, and award of a construction project. The PM/PE shall negotiate and agree on the project engineering budget with the PM before initiation of the design effort. The PM/PE shall consider preestablished design cost index (DCI) targets throughout this process, and be prepared to fully justify budgets that exceed the DCI.

6.1.6 Designer Selection. Military Design Branch shall route all MILCON Design Instructions/Directives received to Design Section Chiefs in Military Design Branch, Geotechnical Branch, Cost Engineering Branch and

Environmental Engineering Branch for a capability determination. In consultation with the customer, Military Design Branch and PPMD shall jointly decide how design shall be accomplished to best serve all concerns.

6.1.7 Work Requests. The PM/PE shall provide to the A-E and/or I-H design teams the following design support data as required, to include a SOS and Funded Work Item (FWI), within a period that will support the established project design schedule:

1) A-E Design Services. The PM/PE shall ensure that a contract is issued to the A-E for work and services. The contract reflects the agreed upon project design schedule and fee, and references the project SOW for required design services.

2) I-H Design Services. The PM/PE shall issue a SOS and FWI to each Branch section to initiate I-H design services for a specific project effort. The SOS is the execution contract between the PM/PE and the I-H design team. The SOS and FWI reflects the agreed upon project design schedule and budget, and references the project SOS for required design services. At no time shall I-H personnel proceed with work without receipt of the SOS and FWI from the PM/PE.

3) Surveys. The PM/PE shall issue a SOS and FWI to the Geology and Mapping Section of Geotechnical Branch to acquire and provide the design team with all topographic data necessary to support project design. The scope and requirements of the survey effort shall be coordinated with the design team.

4) Explorations. The PM/PE shall issue a SOS and FWI to the Geology and Mapping Section of Geotechnical Branch. The Geology Section will acquire and provide the design team with all explorations, lab testing, and boring logs necessary to support project design. The scope and requirements of exploration effort shall be coordinated with the design team.

5) Geotech Report. The PM/PE shall issue a SOS and FWI to the Soil Design Section of Geotechnical Branch. The Soil Design Section will develop and provide the design team with preliminary and final Foundation Reports that address specific requirements of the site and project.

6) Material Report. The PM/PE shall issue a SOS and FWI to the Soil Design Section of Geotechnical Branch. The Soil Design Section will develop and provide the design team with preliminary and final Material Reports that address specific requirements for pavements and special projects.

7) Environmental. The PM/PE shall issue a SOS and FWI to Environmental Engineering Branch sections to develop and provide the design team with asbestos, lead-based paint, and other Hazardous, Toxic, and Radioactive Waste (HTRW) contaminant survey data as necessary. Environmental Engineering Branch representatives shall be invited to Predesign and follow-on review conferences and assist the PM/PE in requirement definition, as applicable.

8) Construction Quality Assurance. The PM/PE shall issue a SOS and FWI to the Construction-Operations Division BCOE review section (SPL/SPK). The Construction-Operations Division (SPL/SPK) will provide BCOE review comments to the design team that address specific requirements of the site and project.

9) Design Verification. The PM/PE shall issue a SOS and FWI to the ET&S Section of Military Design Branch. The ET&S Section will provide ED-M Independent Technical Review comments and BCOE certification to the design team that addresses specific requirements of the site and project.

10) Lessons Learned. The PM/PE shall ensure that lessons learned are entered into the CESPK database, in accordance with established procedures.

11) Specifications. The PM/PE shall issue a SOS and FWI to the ET&S Section of Military Design Branch. The ET&S Section will provide the front-end and Electronic Bid Set to CT.

12) Cost Engineering Branch. The PM/PE shall issue a SOS and FWI to the Cost Engineering Branch. The Cost Engineering Branch will provide the preliminary and final government estimates as requested by the PM/PE.

6.1.8 Quality Plans

6.1.8.1 Quality Control Plan (QCP). A QCP shall be prepared for every engineering product or service. ER 1110-1-12, paragraph 6.a.(1), states the QCP is ". . . a management plan for executing a quality engineering product or service, on schedule and within budget." The QCP for small or simple projects (i.e., Programmed Amount <$500,000) should be a very simple, generic document, setting forth the schedule and a minimum of coordination information. Appendix A-C-C is a sample generic small project QCP. A more comprehensive document, Appendix A-C-D, shall be prepared for large or complex projects (i.e., Programmed Amount >$500,000). See Appendix A-C-E for a sample Design/Build QCP. While a design QCP should be complete, it need not duplicate items of a definitional or procedural nature that are in the QMP. The PE shall submit the QCP to the PM (SPL) for review and incorporation into the Project Management Plan (PMP) and to Chief, Engineering Division for review/approval prior to initiation of the technical work on the project. It is recognized that each design team has their own quality control procedures and each PM/PE their own management style, however, the product shall meet the customer's expectations for quality, cost and schedule. Proper documentation and QC certification shall be included in the District project files.

1) A-E Contracts. The PM/PE shall include a requirement in the SOW to submit a QCP to the Government. The QCP shall address coordination, checking, and correcting for all disciplines. The QCP shall also address a sub-period of service sufficient to satisfy the QC process and the preparation of documentation by the A-E to verify that the QCP has been implemented. The PM/PE and A-E representative should meet with the Contracting Officer's Representative (COR) to emphasize the A-E QC responsibilities. An opportune time is during the first visit of the A-E to the District Office, such as the prenegotiation conference. QC paragraphs shall be added to the SOW as follows:

a) The A-E is reminded of his contractual obligation as stated in the contract clauses (FAR 52.326-23) that he is responsible for the professional quality, technical accuracy, and the total coordination of all designs, drawings, specifications, and other services furnished by this Scope of Work. The A-E shall provide a copy of the proposed Quality Control Plan concurrently with the fee proposal, but under separate cover letter. The plan shall describe the proposed quality control process, method of documenting peer review efforts, and the time line for this QC process and related correction period prior to submittal of the design documents to the Government. See Chapter 1 of the A-E Guide for details.

b) The A-E shall submit one set of his final QC check prints and comments to the SPK with project submittal.

c) The period of work is within the period of service specified in paragraph [__] and shall be [__] calendar days prior to submitting the documents to the Government.

2) Design-Build Contracts. Policy and procedures for Design-Build contracting are found in CESPD Regulation 1180-1-9. The PM/PE shall include a requirement in the RFP to have the designer/contractor submit a QCP to the Government within their proposal. Appendix C of the Design-Build Instructions is an Example Technical Evaluation Criteria for "Design-build" Proposal Evaluation. The QCP shall address coordination, checking, and correcting for all disciplines. Specific policy to establish schedules for performance of quality control tasks shall be outlined. The QCP shall also contain adequate policy for reporting quality control findings to the Contracting Officer. The QCP shall also address a sub-period of service sufficient to satisfy the QC process and the preparation of documentation by the designer/contractor to verify that the QCP has been implemented.

3) I-H Design. In order for Military Design Branch to effectively execute a design, effort must be determined, resources defined and allocated, budget and schedule established, and project specific assumptions documented. Additionally, responsibility and accountability must be delegated and assigned. Project QCP requirements are also addressed in the QMPs of other Branches involved in the design process. All these items collectively define and set performance targets and objectives, the critical first step in execution of a design and must be resourced through design funds.

a) Design Execution Summary (DES). Military Design Branch shall continue to prepare a DES for each I-H MILCON project to document the delegation and assignment of responsibility and accountability, define and set performance targets and objectives for the design effort. The Military Design Branch I-H design team shall develop the DES to reflect all activities that are their responsibility. A project specific DES shall be supplemented with the standard I-H technical Quality Control/Quality Assurance (QC/QA) procedures defined in this QMP. The DES shall be negotiated with and accepted by the PM/PE prior to initiating design. Following acceptance by the PM/PE, the DES shall be formally distributed to the design team members, PM/PE, and other appropriate personnel under a cover memorandum signed by the Chief, Military Design Branch. The four- (4) elements of the DES are defined in the following subparagraphs. Appendix A-C-F contains a sample DES. (Note: on very small projects where it is impractical to prepare a full scale DES, a Fee Proposal will instead be prepared and distributed, with a "cc" to Chief, Military Design Branch for information.)

(1) I-H Design Team. Paragraph 1 of the DES shall identify by discipline and by name the project design team members. In addition, the technical design team leader and PM/PE shall also be identified. Military Design Branch is composed of five sections, three of which are comprised of design disciplines. These technical sections constitute the nucleus of a matrix design team process for execution of I-H designs. These technical sections serve as pools from which specific individuals are identified to create specific project design teams. Following completion of a design, the team is disbanded and individuals return to the pool for their next team assignment. The design team is responsible and accountable for executing the specific project design. The design team leader shall be responsible for the coordination, administrative processing and control of all technical design efforts for a project. The specific technical discipline design effort and details shall be the responsibility of the respective design team members. The design discipline sections are responsible for ensuring appropriate and high quality technical input is provided for each project design effort.

(2) Design Budget. Paragraph two of the DES shall identify by discipline and by phase of design the technical design budget for the project. The budget shall be developed from a Task Resource Analysis (TRA) conducted by each discipline based on anticipated sheet counts and man-hour requirements necessary to comply with the project SOS. The PM/PE shall coordinate the development of the budget, to include all QMP deliverables, and negotiate it with the Resource Manager(s). This technical design budget serves as input to the Total Project Budget.

(3) Design Schedule. Paragraph three of the DES shall identify the project design schedule. The schedule shall identify key interaction and submission points within the design process, and reflect the required design phases to be accomplished. Design and review times shall be separately identified. Sequential calendar completion dates shall be identified for each key point within each phase of design; the calendar day duration between key points shall also be identified. The calendar dates for the initial design phase shall be accurate upon issuance of the DES. Dates for subsequent phases are projected and subject to modification to reflect the actual start date of each phase. The design team leader shall coordinate the development of the design schedule within the design team and negotiate the schedule with the PM/PE for approval. The PM/PE will input the Design Schedule using Microsoft Project.

(4) Design Assumptions. Paragraph four of the DES shall identify the project technical design requirements and assumptions. This paragraph shall cite as a minimum the applicable Predesign Conference Minutes, project SOS and any special technical or process requirements deemed appropriate by the design team leader for the project.

b) Distribution Memorandum. The DES distribution memorandum shall not be issued until the PM/PE (with appropriate customer input) has approved the project specific DES data. The memorandum is then signed by the Chief, Military Design Branch to serve as notice that the project design team, schedule and budget have been defined and approved for an I-H design effort. The memorandum also serves as a vehicle to delegate authority and responsibility to the I-H design team to execute the design for a project.

c) Cost Tracking. The DES sets the performance targets for an I-H design effort. To guide the process to successful completion, monitoring actual performance against the targets throughout the design effort is necessary. The design team leader shall be responsible for preparing Cost Tracking reports at an appropriate frequency for distribution to design team members and selected management personnel. These reports shall compare by discipline and by phase of design the DES budget and schedule targets to actual design cost and percent complete data. Each report shall be distributed via a brief cover memorandum prepared by the design team leader that addresses areas of

interest and concern. In the future under CEFMS and PROMIS, it is envisioned that the PM/PE, in conjunction with PMO staff, shall prepare/distribute cost and schedule tracking information; thus freeing a design team leader to concentrate on technical execution issues. Appendix A-C-G contains a sample Cost Tracking report.

d) Design Completion Summary (DCS). Following completion of an I-H design effort, to complete project execution management procedures (i.e., develop a performance "report card"), actual vs. scheduled performance should be compared and evaluated, if adequate funds remain. Additionally, an archival data file containing actual costs and execution time frames for I-H MILCON design efforts would be an invaluable reference tool to enhance the quality and accuracy of future DES schedules and budgets. To accomplish these goals, the design team leader shall compile a project DCS following submission of the final design documents to the PM/PE for construction advertisement. The DCS shall contain a brief description of the project features (by discipline) supported by selected plan sheets (i.e., list of drawings; Site Plan; Floor Plan; Typical Section(s); and Exterior Elevation(s)); a comparison of actual costs to budget, including cost per plan sheet by discipline information; a comparison of projected schedules to actual execution performance; and a summary of unique project issues affecting cost, the schedule, coordination, etc. which would be helpful as an archival reference to understand and interpret the specific project data. Appendix A-C-H contains a sample DCS.

e) Project Execution Meetings. A management overview of I-H design execution performance and resource use shall be achieved through regularly scheduled Project Execution Meetings. These meetings shall be chaired by the Chief, Military Design Branch with all section chiefs attending. Each active I-H design effort shall be briefly discussed, addressing such items as: compliance with and requested changes to schedules; cost performance and additional funding requirements; user requested changes and impacts; resource requirements; etc. These meetings are primarily informational in nature, however, they can serve as an action/decision forum when required.

6.1.8.2 Quality Assurance Plan (QAP). A QAP shall be prepared for every engineering product or service completed by A-E contract. The PM/PE has the responsibility to review, discuss and obtain Branch approval of the QAP/QCP for each project with the principal of each design team. The PM/PE shall have a system in place to ensure himself/herself that the QAP/QCP is being implemented and followed through each phase of the design process. These activities may include phone calls to the designer to verify scheduled QC functions, design deliverables, and for visits to the designer's office, and/or requesting copies of the designers' QC activity worksheets. Particular attention will be paid to the requirement of the A-E firm to submit a set of final check prints and comments to the PM/PE (see paragraph 6.1.8.1 1) b)). The QAP shall address the above activities and verify that the QCP has been carried out. Appendix A-C-I is a sample Military Design Branch QAP.

6.2 Design Verification

6.2.1 Peer Review/Checking. All projects shall be appropriately checked. Independent spot-checking and review of each designer's assumptions, analyses, and calculations shall be performed throughout the design process. This effort shall be conducted by journeyman or senior personnel within the same technical discipline section who are not directly involved with the development of the project design being reviewed.

The design team leader shall regularly chair several design team coordination meetings throughout the design period. The purpose of these meetings is to discuss evolving design requirements and changes, stimulate interdisciplinary communication and design compatibility. These meetings also generally serve as a forum to stimulate individual designers to function as an integrated design team and enhance the collective quality of the design package.

6.2.2 Senior Staff Overview. Technical discipline or selected senior personnel shall perform an experience-based suitability review of major/critical technical decisions, directions, and system selections embodied in their portion of the project design. This review shall be performed prior to the individual design team members releasing their portion of the design effort to the design team leader. The technical discipline shall be responsible for insuring that their staffs are trained, competent, and suitably overviewed to provide a high level of technical competence for their disciplines' contribution to each design team. Design Team members will consult with their Senior Staff at appropriate points throughout the effort to discuss major assumptions and functional decisions, analytical approaches, and significant calculations to preclude significant comments from occurring that could adversely impact

project schedules and costs. The conclusions/agreements reached should be documented and copies retained by each participant.

6.2.3 Interdisciplinary Team Coordination. The full design team shall conduct a detailed interdisciplinary coordination review after the Senior Staff Overviews. During this review, individual designers shall check for discrepancies, within their work and between their work and the work prepared by other design team members. The goal is to eliminate flaws and conflicts within the plans, the specifications, and between the plans and specifications. The design team will be responsible for developing a well integrated and technically sound design that meets the customer's requirements according to governing criteria and regulations.

6.2.4 Independent Technical Review (ITR). The review process, the level of reviews and agencies responsibilities will be addressed as early as the Predesign conference. In coordination with the I-H review team (differing in membership from design team members), the PM/PE shall establish the review level for each project. This in turn will be reflected in the NAS schedule and the established project design budget. Independent technical reviews of A-E designs shall be accomplished using the Automated Review Management System (ARMS). Similar reviews of I-H designs will utilize ARMS insofar as economical and practical. Those review comments not recorded in ARMS will be retained in project files for use in back checking comments and lessons learned applications.

1) Standard Projects. All standard project designs are subject to an independent technical review by the PM/PE, I-H review team, other appropriate District technical personnel, the customer, and others.

2) Complex or Unique Projects. Independent technical review procedures shall be developed for complex or unique projects on a case by case basis. These special procedures shall be in addition to the standard basic procedures defined in this QMP. These procedures shall be defined, agreed to and budgeted for among the PM/PE, I-H review team, other appropriate District technical personnel, and the customer, when necessary, prior to initiating the review process.

6.2.5 DX/MCX Reviews. Mandatory Centers for Intrusion Detection Systems; Ordnance and Explosives; and Protective Designs shall be contacted as appropriate for their external review services. The HQ USACE Military Program Directorate decrees the use of the Transportation Systems Mandatory Center of Expertise (TSMCX) described in CEMP-ET Memorandum. Roadway designs over $3,000,000 and all airfield or railroad projects designs must be sent to the TSMCX for their review. Designs for Army projects with communications infrastructure shall be reviewed by the ISEC-FDAO. The QCP shall reflect this requirement providing appropriate effort and funding for any MCX review.

6.2.6 Certification. Chief Engineering Division and District Commander shall certify that the quality control process for each design has been completed and that all identified ITR technical issues have been resolved. The PM/PE shall resolve all ITR technical comments and file the signed QC certificate.

6.2.7 Biddability, Constructability, Operability and Environmental (BCOE) Review. BCOE reviews are required in accordance with ER 415-1-11 for all design products, A-E or I-H. BCOE and functional reviews of project design documents shall be conducted in ARMS by Construction-Operations Division personnel and the project customer(s), respectively, following completion of each major stage of design. Designer choice and editorial type comments shall be discouraged. The PM/PE shall arbitrate any unresolved comments between the author(s) and design team. As required by ER 415-1-11, Engineering and Construction-Operations Divisions shall provide formal, written certification that all appropriate BCOE comments have been incorporated in the design documents prior to bid opening and award of the construction contract.

6.2.8 Value Engineering (VE) Studies. VE studies are required for all Military Construction, Army (MCA) projects with an estimated construction value of $2,000,000 or greater. VE studies are required for all Military Construction, Air Force (MCAF) projects only when requested by the customer. The SPK VE office shall schedule and conduct studies for appropriate projects in the most cost effective manner, either by A-E contract or by the VE office. VE is an effective tool to reduce project construction costs and can add to the quality of a design if applied early enough in the design cycle. When applicable, the VE Officer shall coordinate with the project PM/PE the conduct of a VE study early in the design process to maximize quality enhancement and cost reduction ideas. A VE

study is best conducted after completion of the concept design to reduce impact on the design schedule and lost design effort. The PM/PE shall coordinate closely with the design team leader regarding the timing and results of VE studies.

6.2.9 South Pacific Division (SPD) Involvement. SPD is responsible for Military Design QA program management throughout the Division. SPK is the primary MILCON design center for SPK and SPL within SPD. To execute this mission effectively, SPK technical personnel must maintain an open partnership relationship with the SPD. To foster this partnership and enhance MILCON Design Quality Management initiatives, SPD QA team personnel will provide services in support of SPK I-H design programs as defined in CESPD R 1110-1-8, Quality Management Plan.

7.0 RECORDS

Records for the following will be kept in the project files maintained by the PM/PE. Examples of records are the QCP, all comments and their resolutions in ARMS, minutes of review meetings, and the BCOE certification.

a. Design directives

b. Predesign conference minutes

c. Scope of Work or Scope of Services

d. Total Project Budget

e. Project Schedule

f. Notice to Proceed

g. A-E/I-H QCP document

h. Evaluation of the QCP

i. I-H DES

j. I-H Distribution Memorandum

k. A-E QAP document

l. QA checklist/certification

m. List of key review milestones

n. Annotated comments by the QA team

o. QC certificate

p. BCOE certificate

q. A-E/I-H performance evaluation

r. Draft 1354 Data Sheets

s. I-H DCS